SECTION 15211

COMPRESSED AIR SYSTEM

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**LANL MASTER CONSTRUCTION SPECIFICATION**

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the ESM Mechanical POC.

**NOTE:** When compressed air system exceeds 150 psig, verify all material specified meets the design pressure/temperature requirements.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within “stars” during editing.

Coordinate this Specification with Mechanical Standard Drawings ST-D2090-1.

Specification developed for ML-3 / ML-4projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Pipe fittings, valves, and accessories
2. Filters
3. Automatic drain valves
4. Torpedo Oil/Water separators
5. Air dryers
6. Pressure regulating valves
7. Air receivers
8. Safety valves
9. Air compressors

1.2 SUBMITTALS

A. Submit the following in accordance with Section 01330, Submittal Procedures:

1. Catalog data

2. Installation instructions

3. Materials/Parts list

4. Operational and Maintenance data

5. Warranties

6. Welding Procedures, per ASME section 9.

7. Welder Certifications, per ASME section 9.

8. Welding Inspection Reports, as applicable.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 5 years experience and having maintenance service based within 200 miles radius of installation.

B. Material and Installation: Conform to ASME B31.9, Building Services Piping for systems operating at pressure of 150 psig or less and at temperature of 200 degrees F or less. For systems beyond above pressure and temperature limitations, conform to ASME B31.1, Power Piping.

1.4 WARRANTIES

A. Provide a minimum of 1-year manufacturer's warranty, parts and labor, for air compressor system.

PART 2 PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTION

A. Alternate products may be accepted; follow Section 01630, Product Options and Substitutions.

2.2 COPPER TUBING AND FITTINGS (UP TO 2 INCHES)

A. Tubing: Copper, hard drawn, ASTM B88, Type L

B. Fittings: Wrought copper, ASME B16.22

C. Joints: ASTM B32, solder, Grade 95TA

2.3 STEEL PIPE AND FITTINGS (OVER 2 INCHES)

A. Pipe: Black steel, ASTM A53, Schedule 40

B. Fittings: Steel, ASTM A234, Grade B, Schedule 40, butt-welding type

C. Joints: Welded

2.4 VALVES

A. Gate Valves: Class 125 or 150, bronze body, bronze trim, rising stem, handwheel, inside screw, solid wedge disc, ends to suit piping.

B. Ball Valves: Class 150, bronze, chrome-plated brass ball, full port, teflon seats and stuffing box ring, lever handle, ends to suit piping.

C. Globe Valve: Class 150, bronze body, bronze trim, ends to suit piping.

D. Swing Check Valve: Class 125, bronze body and cap, bronze swing disc with rubber seat, ends to suit piping system.

2.5 STRAINER

A. "Y" type, Class 150, 20 mesh stainless steel screen, cast iron body, with blowoff gate valve and plug, ends to suit piping system.

2.6 UNIONS AND FLANGES

A. Unions

1. Ferrous Pipe: 150 psi malleable iron threaded unions.

2. Copper Tube and Pipe: 150 psi bronze unions with soldered joints.

B. Dielectric Unions

1. Union with galvanized or plated steel threaded end, copper solder end, water-impervious isolation barrier.

C. Flanges

1. Forged carbon steel, ASTM A105, Class [150]

2.7 FLEXIBLE CONNECTOR

A. Manufacturer: Flex-Hose, Pumpsaver Connectors.

B. Braided bronze or stainless steel flexible connector with corrugated metal hose, minimum working pressure 200 psi at 70 degree F, minimum temperature rating 400 degree F, with ends to suit piping system.

2.8 PREFILTER, HIGH-EFFICIENCY COALESCING

**********
When selecting filter, assume maximum flow conditions at the minimum operating pressure. Match inlet and outlet connections to system pipe size.
**********

A. Manufacturers:

1. Van Air, Housing Series F200, Filter Grade C

2. Pneumatics Products, Housing Series P2001, Filter Grade SU

B. High-efficiency coalescing filter efficiency 99.99 percent at 0.6 microns, maximum oil carryover 0.008 ppm by weight, maximum inlet temperature 125 degrees F, maximum clean dry pressure drop 1.50 psid. Housing maximum working pressure 250 psig at 225 degrees F, furnish with optional two-sided color-coded pressure differential indicator, and without internal float drain.

1. In/Out Connection: [ ] inches NPT

2. Flow Capacity: [ ] scfm at 100 psig

2.9 AFTERFILTER, HIGH-EFFICIENCY PARTICULATE

**********
When selecting filter, assume maximum flow conditions at the minimum operating pressure. Match inlet and outlet connections to system pipe size.
**********

A. Manufacturers:

1. Van Air, Housing Series F200, Filter Grade RC

2. Pneumatics Products, Housing Series P2001, Filter Grade AF

B. High-efficiency particulate filter efficiency 99.99 percent at 0.9 microns, maximum inlet temperature 150 degrees F, maximum clean dry pressure drop 1.50 psid. Housing maximum working pressure 250 psig at 225 degrees F, furnish with optional two-sided color-coded pressure differential indicator, and without internal float drain.

1. In/Out Connection: [ ] inches NPT

2. Flow Capacity: [ ] scfm at 100 psig

2.10 AUTOMATIC DRAIN VALVE

A. Manufacturer: Van Air, Model EDV-2002

B. Solenoid valve, brass body, NEMA 4 enclosure, rated at 300 psig, open time 1 to 60 seconds cycle time 1-60 minutes, 6 foot power cord with plug, electrical [115V/ 1 PH/60 Hz] [230V/ 1 PH/ 60 Hz], maximum fluid temperature 210 degrees F, ambient temperature range 32-150 degrees F.

1. Valve In/Out Port Size: [1/4] [1/2] inch NPT

****** [OR] ******

2.11 AUTOMATIC DRAIN VALVE (ZERO AIR LOSS)

A. Manufacturer: Zeks, Model NCC1701-D.

B. Zero air loss drain valve, 1/2 inch NPT connections, pressure range 0-230 psi, temperature range 36 - 120 degree F, electrical connection [115] [230] VAC, NEMA 4 enclosure, and Y-strainer. Operation, 50 volume checks/second.

2.12 TORPEDO OIL/WATER SEPARATOR

**********
Consult with FM facility engineer for type of oil/water separator (torpedo or commercially available) to be specified. Specify 2 inch diameter torpedo for compressors less than or equal to 5hp; 4 inch diameter torpedo for compressors greater than 5hp. Alternative is to specify a commercially available oil/water separator such as Van Air Model ES Series. Consult with manufacturers' representative for application and sizing information.
**********

A. Manufacturer: Eggelhof Inc., Albuquerque, [4 inch, Model No. 4 - 20 ABS] [2 inch, Model 2 - 20 ABS]. No Substitution.

B. 4 inch diameter oil/water torpedo separator, ABS construction, 20 inch long.

C. 2 inch diameter oil/water torpedo separator, ABS construction, 20 inch long.

D. Furnish above with safety cable and 20 x 20 inch polypropylene absorbent pad.

2.13 REGENERATIVE AIR DRYER

A. Manufacturers:

1. Van Air, Model HLS-[ ], HL-[ ].

2. Pneumatic Products, DHA Series, Model [ ].

B. Heatless, regenerative dryer, minus 40 degrees F pressure dew point, solid state controller, twin towers, with adsorbent desiccant, purge exhaust valve and muffler, drain connection and cycle saver control option that adjusts dryer purge to actual moisture load condition and includes failure to switch (FTS) alarm.

1. Capacity: [ ] scfm at [ ]psig

2. Power Voltage: [ ] V, [ ] phase, 60 Hz.

2.14 REFRIGERATED AIR DRYER (AIR COOLED)

A. Manufacturers:

1. Van Air, [Model RD ].

2. Hankison, [Model HPR ].

B. Refrigerated air dryer, air cooled condenser, 35-38 degrees F pressure dew point, indoor installation (ambient temperature 40-100 degrees F), automatic drain valve, and charged with R134a or R22 refrigerants.

1. Capacity: [ ] scfm at [ ]degrees F inlet temperature and [ ] psig inlet pressure.

2. Power Voltage: [ ] V, [ ] phase, 60 Hz.

2.15 REFRIGERATED AIR DRYER (WATER COOLED)

A. Manufacturers:

1. Van Air, Model RDW-[ ].

2. Hankison, Model HPRFW [ ].

B. Refrigerated air dryer, water cooled, 35-38 degrees F pressure dew point, indoor installation (ambient temperature 40-100 degrees F), automatic drain valve, and water regulating valve.

1. Capacity: [ ] scfm at [ ] degrees F inlet temperature and [ ] psig inlet temperature.

2. Power Voltage: [ ] V, [ ] phase, 60 Hz.

2.16 PRESSURE GAUGE

**********
Refer to manufacturer's recommendations for pressure ranges. Generally, a range of twice the working pressure is recommended, with a maximum working pressure not exceeding 75 percent of the range.
**********

A. Manufacturer: Ashcroft, Type 1009.

B. ASME B40.100, Grade 1A, minimum 2 1/2 inch dial, 1/4 inch NPT brass bottom connection, maximum plus or minus 1 percent full scale accuracy, stainless steel case, phosphor bronze bourdon tube, and isolation valve.

1. Range: [ ] psi or [as specified on drawings].

2. Cock Valve: 1/4 inch brass plug, 250 psi working pressure valve. Manufacturer: Anderson Metals, PAC-56NB, Part No. 138-00110.

2.17 PRESSURE REGULATING VALVE

A. Manufacturer: Watts, No. R119 Series

B. Reduced pressure type, range [0-125 psig], diaphragm operated, relieving spring adjustment mechanism, rated at 300 psig maximum, temperature range 40 - 120 degrees F.

2.18 DEW POINT TEST FITTING

A. Manufacturer: Hansen, No. GR-602.

B. Brass quick-disconnect fitting, 1/4 inch FPT x QD.

2.19 MOISTURE INDICATOR

**********
Provide visible moisture indicator when not provided with regenerative dryer. Do not install on system with refrigerated dryer.
**********

A. Manufacturers:

1. Van Air, No. 46-2300.

2. Pneumatic Products, Aquadex.

B. Visible moisture indicator assembly, with indicating silica gel that changes from blue to pink at dew point of 0 - 10 degrees F, and back to blue when dew point is lower than minus 10 degree F.

2.20 AIR RECEIVER

A. Manufacturer: Hanson Tank

B. Carbon steel tank built and tested to ASME Section VIII, Division 1 Pressure Vessel Code, “U” stamped.

1. Configuration: [Vertical] [Horizontal] tank with ring base and standard, screw or flange inlet and outlet connections with factory exterior prime coat.

2. Size: [ ] gallons, rated at [ ] psi, [ ] diameter x [ ] long.

2.21 SAFETY VALVE

A. Manufacturer: Kunkle Model 6010.

B. Safety valve for air service, side outlet, full nozzle design, bronze body, brass and bronze trim, pressure range 15-250 psig, temperature range minus 60 to 406 degrees F, NPT ends, built and tested to ASME Section VIII, Division 1 Pressure Code, “UV” stamped.

1. Inlet Size: [ ] inch.

2. Set Pressure: [ ] psi.

3. Capacity: [ ] scfm.

2.22 AIR COMPRESSOR

**********
Consult with manufacturer’s representative, CSRF Spectext, and the LANL Engineering Manual chapter when writing an air compressor specification. Furnish compressors with an after cooler, mechanical separator and an intake air filter silencer. If sound control is a factor, an intake filter silencer, muffler or sound enclosure may be required. Furnish duplex compressors with hour meters.
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PART 3 EXECUTION

3.1 INSTALLATION

A. Install compressor unit on concrete housekeeping pad.

B. Install compressor unit on vibration isolators. Level and bolt in place.

C. Route condensate drains to nearest floor drain.

D. Provide drain valves at low points of piping system.

E. Install take-offs to outlets from top of main, with shutoff valve after take-off. Slope take-off piping to outlets.

F. Install compressed air couplings, female quick connectors, and pressure gages where branch outlets are indicated.

G. Labeling: Refer to Section 15075.

H. Pressure Testing: Refer to Section 15992.

I. Cap or seal ends of piping when not connected to mechanical equipment to ensure contamination by foreign material does not occur.

END OF SECTION

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Do not delete the following reference information:
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This project specification is based on LANL Master Construction Specification Rev. 6, dated October 5, 2005.